

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA20 | Curdworth to Middleton

Data appendix (LQ-001-020)

Land quality

November 2013

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Department
for Transport

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1 Introduction

1.1.1 The land quality appendices for the Curdworth to Middleton study area comprise:

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological SSSI and local geological sites (Section 5);
- mining and minerals data (Section 6).

1.1.2 Maps referred to throughout the land quality appendix are contained in the Volume 5 land quality map book.

2 Engagement

- 2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment for the study area, the types of information that have been provided to the assessment team and any specific concerns of those engaged with.

Table 1: Engagement on land quality issues undertaken for Curdworth to Middleton

Local authority or other organisation	Information provided and/or specific concerns
North Warwickshire Borough Council	Consulted for information on land contamination (via email 26 March 2013). The Council provided additional information on potentially contaminated areas identified by the desk study process and provided information on further areas which had not been picked up in the desk study. Information was also provided on areas of land which have been remediated although no details of the remediation undertaken were able to be provided.
Warwickshire County Council	Meeting held on 13 March 2013. Information on mineral sites (i.e. Mineral Safeguarding Areas within the study area of the Proposed Scheme) received as paper copies in November 2012 and digitally on 12 April 2013.

3 Detailed risk assessment

3.1.1 This appendix presents assessments for the areas assessed as potentially posing a contaminative risk for the Proposed Scheme. For each site the following data is presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 The sites assessed in this study area are set out in Table 2.

Table 2: Detailed risk assessment for areas assessed as potentially posing a contaminative risk for the Proposed Scheme.

Site reference	Name	Table nos.
20-02	Coleshill sewage treatment works (former sludge beds and current works)	3 – 6
20-04	Infilled pond	7 – 10
20-06	Coleshill Water Reclamation Works historical landfill	11 – 14
20-09	Former Hams Hall Power Station	15 – 18
20-10	Infilled pond	19 – 22
20-15	Infilled pit	23 – 26
20-16	Dog Kennel Belt historical landfill	27 – 30
20-17	Land West of Hams Lane historical landfill	31 – 34
20-18	Land East of Hams Lane historical landfill	35 – 38
20-24	Infilled pond	39 – 42
20-25	Infilled pond	43 – 46
20-28	Infilled pit	47 – 50
20-29	Lea Marston No.2 historical landfill	51 – 54
20-30	Infilled pond	55 – 58
20-31	Infilled pond	59 – 62
20-32	Infilled pond	55 – 58
20-33	Infilled well	63 – 66
20-38	Infilled pond	67 – 70
20-39	Infilled pond	71 – 74
20-40	M42 Mullensgrove Farm historical landfill	75 – 78
20-41	Cocksparrow farm historical landfill	79 – 82
20-45	Infilled well	83 – 86

Site reference	Name	Table nos.
20-48	Middleton Hall No. 2 historical landfill	87 – 90
20-49	Infilled well	91 – 94
20-50	Middleton Hall Sand and Gravel historical landfill	95 – 98
20-53	Former petrol filling station	99 – 102
20-58	Railway line	103 – 106
20-61	Hams Hall electricity substation	107 – 110
20-62	Dunton Island landfill	111 – 114
20-63	Mullensgrove Farm	115 – 118

3.1.3 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8¹. Although this report has been withdrawn by the Environment Agency, there has been no subsequent authoritative document to replace it.

3.1.4 The remainder of this section of this appendix presents the conceptual site models (CSM) and risk assessments for the sites set out in Table 2.

¹ DEFRA and Environment Agency (2002), *CLR 8: Potential Contaminants for the Assessment of Land Contamination*.

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Table 3: 20-02 Coleshill Sewage Treatment Works baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Coleshill Sewage Treatment Works</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to heavy metals, other inorganic contaminants, fuels, oils, other organic contaminants, alkalis, acids (treatment chemicals), methane, carbon dioxide and hydrogen sulphide</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - drains, River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Coleshill Sewage Treatment Works spans the boundary between the Coleshill Junction and Curdworth to Middleton study areas. Within the Curdworth to Middleton area the Proposed Scheme will cross sludge beds and tanks of the sewage works on embankment and viaduct. There are residential properties approximately 150m to the south east of the Curdworth to Middleton area and commercial properties of Hams Hall Distribution park to the north. The River Tame borders the southern part of the site within the Curdworth to Middleton study area and Minworth Effluent Conduit lies directly to the north of the site. Superficial deposits underlying the site are classified as a Secondary A aquifer and bedrock is classified as a Secondary B aquifer.

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Table 4: 20-02 Coleshill Sewage Treatment Works construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
<p>Coleshill Sewage Treatment Works</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to heavy metals, other inorganic contaminants, fuels, oils, other organic contaminants, alkalis, acids (treatment chemicals), methane, carbon dioxide and hydrogen sulphide</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
	Off-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Likely	Minor	Moderate/low
	Controlled waters - drains, River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas	Unlikely	Moderate	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Main risk					Moderate/low risk

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be undertaken prior to construction to identify the type, depth and extent of any contamination
- remediation will be undertaken if necessary which is likely to involve the removal or remediation of any contaminated ground encountered within the land take area.
- during remediation and construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice (CoCP).

Note

Construction workers have not been included in this assessment. There is considered to be an increased risk to groundwater and surface waters during construction due to the increased potential for mobilisation and leaching of contaminants.

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Table 5: 20-02 Coleshill Sewage Treatment Works post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
<p>Coleshill Sewage Treatment Works</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to heavy metals, other inorganic contaminants, fuels, oils, other organic contaminants, alkalis, acids (treatment chemicals), methane, carbon dioxide and hydrogen sulphide</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
	Off-site users of commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - drains, River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is assumed that any contaminated material encountered will be removed during construction so there should be no residual contamination within the area required for construction, but the sewage works will remain.
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Table 6: 20-02 Coleshill Sewage Treatment Works Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and B aquifers	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Low	Minor adverse	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Moderate/low	Low		
Overall Significance				Negligible to minor adverse	Negligible

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Table 7: 20-04 Infilled pond baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A Superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - River Tame - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

An infilled pond is located in the eastern part of the area of land required to construct the Proposed Scheme, spanning the Coleshill Junction and Curdworth to Middleton study areas. The Proposed Scheme will be constructed on embankment and works taking place closest to the infilled pond will include earthworks and highway construction works. A realistic and worst case scenario is assumed that the pond was manually infilled with waste and a full range of contaminants including leachate and ground (landfill) gas are associated with the infilled ground. There are residential property receptors within approximately 150m of the south-west of the site and commercial property receptors of Coleshill Sewage Treatment Works directly to the east and within 50m to the north. The River Tame is located approximately 10m to the north and there are drains within 100m to the west.

Table 8: 20-04, Infilled pond construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A Superficial and Secondary B bedrock aquifers	Likely	Minor	Moderate/low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Likely	Minor	Moderate/low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be undertaken prior to construction to identify the type, depth and extent of any contamination
- remediation will be undertaken if necessary which is likely to involve the removal or remediation of any contaminated ground encountered within the land take area.
- during remediation and construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There is considered to be an increased risk to groundwater during construction because the area of infilled ground will be disturbed during highway construction works and there will be increased potential for mobilisation and leaching of contaminants.

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Table 9: 20-04 Infilled pond post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Off-site residents	Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A Superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The area of infilled ground will have been disturbed during construction and any contaminated material encountered will be removed from the area of land required to construct the Proposed Scheme; however there may be some areas which remain undisturbed so the risks are considered to remain the same as at baseline.

Table 10: 20-04 Infilled pond Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	n/a	n/a	n/a	n/a
Exposure of adjacent human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of adjacent human receptors (commercial) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and B aquifers	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Low	Minor adverse	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Moderate/low	Low	Minor adverse	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

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Table 11: 20-06 Coleshill Water Reclamation Works historical landfill baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Coleshill Water Reclamation Works historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - River Tame - Minworth Effluent Conduit	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Coleshill Water Reclamation Works historical landfill is located at Coleshill Sewage Treatment Works and accepted inert and liquids/sludge waste between 1983 and an unknown date. The landfill lies partially in the area of land required to construct the Proposed Scheme which will be constructed on viaduct in this location. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. Works taking place on the site of the landfill include a satellite compound. The landfill is bounded to the north and south by Minworth Effluent Conduit and the River Tame respectively, both of which will be crossed by the Proposed Scheme. There are commercial properties adjacent to the north, south and west of the landfill.

Table 12: 20-06 Coleshill Water Reclamation works construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Coleshill Water Reclamation Works historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - River Tame - Minworth Effluent Conduit	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be undertaken prior to construction to identify the type, depth and extent of any contamination
- remediation will be undertaken if necessary which is likely to involve the removal or remediation of any contaminated ground encountered within the area of land required to construct the Proposed Scheme.
- during remediation and construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There is considered to be an increased risk to groundwater during construction due to the increasing potential for mobilisation and leaching of contaminants.

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Table 13: 20-06 Coleshill Water Reclamation Works historical landfill post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Coleshill Water Reclamation Works historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - River Tame - Minworth Effluent Conduit	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The majority of the landfill lies outside of the area of land required to construct the Proposed Scheme so most of it will remain undisturbed and the risks are considered to remain the same as at baseline.

Table 14: 20-06 Coleshill Water Reclamation Works Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

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Table 15: 20-09 Hams Hall baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former Hams Hall Power Station Existing contaminants in the soils and groundwater at the site, potentially including but not limited to fuels, oils, metals, other inorganic contaminants, organic contaminants, PAHs, PCBs and asbestos.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Adjacent residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of adjacent commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - adjacent watercourses	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Likely	Negligible	Low
Main risk	Low risk				

Description

The Hams Hall site was once home to three coal-fired power stations which closed in 1975, 1981, and 1992. It is now the site of Hams Hall Distribution Park, an industrial estate with on-site commercial properties. There are off-site residential properties at Newlands Farm and adjacent commercial properties. A realistic and worst case scenario is assumed that a full range of contaminants associated with the former power station remain although it is understood from North Warwick Council that some investigation and remediation has been undertaken on parts of this site. The site is located on route and up to 250m from the area of land required to construct the Proposed Scheme which will be constructed on viaduct and embankment in this area. The nearest surface watercourses to the site are Minworth Effluent Conduit which flows adjacent to the southern boundary of the site, several drains and ponds around the site. Superficial deposits at the site are classified as a Secondary A aquifer and the bedrock is classified as a Secondary B aquifer.

Note

North Warwick have confirmed that investigations have been undertaken on various areas of this site but little documentation is held confirming remediation undertaken

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Table 16: 20-09 Hams Hall construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Former Hams Hall Power Station Existing contaminants in the soils and groundwater at the site, potentially including but not limited to fuels, oils, metals, other inorganic contaminants, organic contaminants, PAHs, PCBs and asbestos.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Adjacent residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of adjacent commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - adjacent watercourses	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Likely	Negligible	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be undertaken prior to construction to identify the type, depth and extent of any contamination
- remediation will be undertaken if necessary which is likely to involve the removal or remediation of any contaminated ground encountered within the land take area.
- during remediation and construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There may be a slight increase in risk to groundwater and surface waters as a result of viaduct construction across part of the site.

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Table 17: 20-09 Hams Hall post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Former Hams Hall Power Station Existing contaminants in the soils and groundwater at the site, potentially including but not limited to fuels, oils, metals, other inorganic contaminants, organic contaminants, PAHs, PCBs and asbestos.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Adjacent residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of adjacent commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - adjacent watercourses	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Likely	Negligible	Low
Main risk	Low risk				

Note

It is assumed that any contamination relating to the power station within the permanent land take area will have been remediated, therefore reducing the risk to human receptors. Contamination may remain outside of the area of land take so some risk still remains to the identified receptors.

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Table 18: 20-09 Hams Hall Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Low	Minor adverse	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 19: 20-10 Infilled pond Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Adjacent residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - surface water drains	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled pond is located in the area of land required to construct the Proposed Scheme which will be constructed on embankment. Works closest to the infilled ground will include ecological mitigation, highways works, electricity pylon realignment and an area of workers' accommodation. A realistic and worst case scenario is assumed that the pond was manually infilled with waste and a full range of contaminants including leachate and ground (landfill) gas are associated with the infilled ground. There are residential properties of Newlands Farm adjacent to the infilled pond and commercial properties of Hams Hall Distribution Park approximately 100m to the east. There are three surface water drains within 250m of the infilled pond. Superficial deposits at the site are classified as a Secondary A aquifer and bedrock is classified as a Secondary B aquifer.

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Table 20: 20-10 Infilled pond Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Adjacent residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Likely	Minor	Moderate/low
	Controlled waters - surface water drains	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation will be undertaken prior to construction.
- it is unlikely that remediation will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. The area of the infilled pond may be disturbed during construction and there is increased potential for mobilisation and leaching of contamination with an increased risk to groundwater.

Table 21: 20-10 Infilled pond Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Adjacent residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - surface water drains	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Although the infilled pond lies within the area of land required to construct the Proposed Scheme, it may not be completely disturbed and therefore some contamination may remain so the risks are considered to remain the same as at baseline.

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Table 22: 20-10 Infilled pond Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 23: 20-15 Infilled pit Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled pit Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled pit is located within the area of land required to construct the Proposed Scheme, in the area where the Kingsbury Road Railhead diverges from the Birmingham and Derby railway line in cutting. A realistic and worst case scenario is assumed that the pit was manually infilled with waste and a full range of contaminants including leachate and ground (landfill) gas are associated with the infilled ground. A drain is located approximately 160m to the west of the infilled pit and there are commercial properties of Hams Hall electricity substation and Hams Hall Distribution Park within 250m to the west and east respectively. Superficial deposits in this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

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Table 24: 20-15 Infilled pit Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pit Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Likely	Minor	Moderate/low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation will be undertaken prior to construction
- it is unlikely that remediation will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There may be an increased risk to groundwater during construction due to the increased potential for mobilisation and leaching of contamination.

Table 25: 20-15 Infilled pit Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pit Existing contaminants in the soils and groundwater at the source, potentially including but not limited to a range of inorganic and organic contaminants, leachate and ground (landfill) gas.	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial and Secondary B bedrock aquifers	Low likelihood	Minor	Low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

The infilled pond may not be entirely disturbed and some residual contamination may remain so the risks are considered to remain the same as at baseline
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Table 26: 20-15 Infilled pit Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 27: 20-16 Dog Kennel Belt historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Dog Kennel Belt historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - surface watercourses and water bodies	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Dog Kennel Belt historical landfill lies adjacent to the area of land required to construct the Proposed Scheme which will be constructed in cutting. Works which will take place in the area closest to the landfill include the Kingsbury Road Railhead where it diverges from the Birmingham and Derby railway line. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There are no available records on the dates of operation or the types of waste accepted. There are drains directly adjacent to and within approximately 50m of the landfill and commercial properties of Hams Hall electricity substation within 20m to the west. Superficial deposits in this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

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Table 28: 20-16 Dog Kennel Belt historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Dog Kennel Belt historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - surface watercourses and water bodies	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation will be undertaken prior to construction because the landfill lies outside of the area of land required to construct the Proposed Scheme.
- it is unlikely that remediation will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There is considered to be a greater risk to groundwater during construction due to the increasing potential for mobilisation and leaching of contaminants.

Table 29: 20-16 Dog Kennel Belt historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Dog Kennel Belt historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - surface watercourses and water bodies	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Any contaminated material encountered within the area of land required to construct the Proposed Scheme will have been removed during construction, but the landfill itself will remain undisturbed and the risks are considered to remain the same as at baseline.

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Table 30: 20-16 Dog Kennel Belt historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 31: 20-17 Land West of Hams Lane historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Land West of Hams Lane historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Land West of Hams Lane historical landfill lies adjacent to the area of land required to construct the Proposed Scheme and accepted inert waste between 1977 and 1988. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. The Proposed Scheme in this area will be constructed in cutting, and works closest to the landfill will include an access route and realignment of electricity pylons. Commercial properties of Hams Hall electricity substation border the site to the south and there are residential properties of Lea Marston approximately 200m to the east. A drain borders the landfill to the south. A pocket of superficial deposits in this location are classified as a Secondary (Undifferentiated) aquifer and the underlying bedrock is classified as a Secondary B aquifer.

Table 32: 20-17 Land West of Hams Lane historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Land West of Hams Lane historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation will be undertaken prior to construction because the landfill lies outside of the area of land required to construct the Proposed Scheme.
- it is unlikely that remediation will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. Contamination from the landfill may have migrated into the area of land required to construct the Proposed Scheme and there is considered to be an increased risk to groundwater due to the potential for leaching of contaminants.

Table 33: 20-17 Land West of Hams Lane historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Land West of Hams Lane historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low risk
Main risk	Low risk				

Note

Any contaminated material encountered within the area of land required to construct the Proposed Scheme will have been removed during construction, but the landfill itself will remain undisturbed and the risks are considered to remain the same as at baseline.

Table 34: 20-17 Land West of Hams Lane historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible

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Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 35: 20-18 Land East of Hams Lane historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Land East of Hams Lane historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Land East of Hams Lane historical landfill lies adjacent to area of land required to construct the Proposed Scheme where the Kingsbury Road Railhead diverges from the Birmingham and Derby railway line. As well as the railhead, other works include a balancing pond. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There is no available information on the dates of operation or types of waste accepted at the landfill. The Proposed Scheme in this area will be constructed in cutting. There appear to be farm properties on the site and there are residential directly to the north-east of the site and commercial properties approximately 200m to the south-west of the site. The nearest surface waters are drains and ponds on and around the landfills. Superficial deposits in this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

Table 36: 20-18 Land East of Hams Lane historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Land East of Hams Lane historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - drains - River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation will be undertaken prior to construction because the landfill lies outside of the area of land required to construct the Proposed Scheme

- it is unlikely that remediation will be required.

- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. Contamination may have migrated into the area of land required to construct the Proposed Scheme and there is considered to be an increased risk to groundwater during construction due to the increased potential for mobilisation and leaching of contaminants.

Table 37: 20-18 Land East of Hams Lane historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Land East of Hams Lane historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Any contamination which has migrated into the area of land required to construct the Proposed Scheme will have been removed but the landfill itself will remain undisturbed and the risks are considered to remain the same as at baseline.

Table 38: 20-18 Land East of Hams Lane historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible

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Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 39: 20-24 Infilled Pond Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled Pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

An infilled pond is located adjacent to Kingsbury Road within the area of land required to construct the Proposed Scheme which will be constructed in cutting (Leeds Spur). Works taking place in the vicinity of the infilled pond include realignment of Kingsbury Road and ecological mitigation. A realistic and worst case scenario is assumed that the pond was manually infilled with waste and a full range of contaminants including leachate and landfill gas are associated with the infilled ground. There are residential properties to the east, south-west and west within 20m of the site and there are two ponds within 20m to the east and west. Bedrock underlying the site is classified as a Secondary B aquifer; superficial deposits are absent.

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Table 40: 20-24 Infilled Pond Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled Pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will not be carried out prior to construction
- it is unlikely that remediation over and above the removal of contaminated material will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. It is considered that there may be a slightly increased risk of mobilisation and leaching of existing contamination to groundwater during construction.

Table 41: 20-24 Infilled Pond Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled Pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Any contaminated material encountered will be removed, but the infilled pond may not be entirely disturbed so the risks are considered to remain the same as at baseline.

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Table 42: 20-24 Infilled Pond Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site residents to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site residents to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site residents to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 43: 20-25 Infilled Pond Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Infilled Pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds, drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

The infilled pond is located in the area of land required to construct the Proposed Scheme which will be constructed in cutting (Leeds Spur). The extent of the cutting appears to encompass part of the infilled pond. A realistic and worst case scenario is assumed that the pond was manually infilled with waste and a full range of contaminants including leachate and landfill gas are associated with the infilled ground. Residential properties of Mullensgrove Farm are located within 50m to the south of the infilled pond and there are two ponds and a drain within 170m. Bedrock underlying the infilled pond is classified as a Secondary B aquifer; superficial deposits are absent.

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Table 44: 20-25 Infilled Pond Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled Pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation is unlikely to be undertaken prior to construction
- it is unlikely that remediation over and above the removal of contaminated material will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. It is considered that there may be a slightly increased risk of mobilisation and leaching of existing contamination to groundwater during construction.

Table 45: 20-25 Infilled Pond Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled Pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

Some of the infilled pond may remain undisturbed so the risks are considered to remain the same as at baseline.

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Table 46: 20-25 Infilled Pond Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site residents to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site residents to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site residents to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 47: 20-28 Infilled pit Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled pit Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

An infilled pit is located adjacent to Wheatley House adjacent to the area of land required to construct the Proposed Scheme. Works taking place closest to the infilled pit will include construction/upgrade of an access track and ecological mitigation. For the purposes of this assessment a realistic and worst case assumption has been made that the pit has undergone manual infilling. Residential properties are located adjacent to and within 150m of the west of the infilled pit and there are a number of ponds within 250m of the south of the infilled pit.

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Table 48: 20-28 Infilled pit Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pit Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.
 The infilled pit itself will not be disturbed during construction, but contamination may have migrated into the area of land required for construction so there is potential for mobilisation of potential contamination. There is therefore considered to be an increased risk to groundwater during construction.

Table 49: 20-28 Infilled pit Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pit Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

Any contamination encountered in the area required to construct the Proposed Scheme will be removed, but the infilled pit itself will remain undisturbed so the risks are considered to remain the same as at baseline.

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Table 50: 20-28 Infilled pit Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site residents to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site residents to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site residents to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Range of Significance				Negligible	Negligible

Table 51: 20-29 Lea Marston No.2 historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Lea Marston No.2 historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

The Lea Marston No.2 historical landfill is located 135m to the east of the area of land required to construct the Proposed Scheme which will be constructed in cutting. Works in the area closest to the landfill include access road construction. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There is no available information on the dates of operation or types of waste accepted at the landfill. Superficial deposits are classified as a Secondary A aquifer and the bedrock is classified as a Secondary B aquifer. A number of ponds and drains are present within 250m of the landfill and there are residential and commercial properties to the north and west of the landfill.

Table 52: 20-29 Lea Marston No. 2 historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Lea Marston No.2 historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.

- remediation is unlikely to be required.

- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.

The landfill itself will not be disturbed during construction and given the distance from the nearest works (135m) it is considered unlikely that any contamination that may have migrated from the landfill will be disturbed.

Table 53: 20-29 Lea Marston No.2 historical landfill Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Lea Marston No.2 historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drains - ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

The landfill will remain undisturbed so the risks are considered to remain the same as at baseline.

Table 54: 20-29 Lea Marston No.2 historical landfill Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Low	Low		
Range of Significance				Negligible	Negligible

Table 55: 20-30 and 20-32 Infilled ponds Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled ponds Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

Two infilled ponds are located off Kingsbury Road in Marston approximately 45m from the area of land required to construct the Proposed Scheme. Works closest to the infilled ponds will comprise upgrade/construction of an access road. For the purposes of this assessment a realistic and worst case assumption has been made that the ponds have undergone manual infilling. There are residential properties of Marston within 50m of the infilled ponds and commercial properties within 220m. A drain runs adjacent to the infilled ponds. Superficial deposits are classified as a Secondary A aquifer and the bedrock is classified as a Secondary B aquifer.

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Table 56: 20-30 and 20-32 Infilled ponds Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled ponds Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground will not be undertaken prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.

The infilled ponds will not be disturbed during construction and it is considered unlikely that contamination will have migrated into the area of land required to construct the Proposed Scheme.

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Table 57: 20-30 and 20-32 Infilled ponds Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled ponds Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - drain	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

The infilled ponds will remain undisturbed so the risks will remain the same as at baseline.

Table 58: 20-30 and 20-32 Infilled ponds Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Range of significance				Negligible	Negligible

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Table 59: 20-31 Infilled pond Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
		Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
	Property - infrastructure, their foundations and services	Direct run-off from site	Unlikely	Minor	Very low
		Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into enclosed spaces	Unlikely	Moderate	Low
Main risk	Low				

Description

An infilled pond is located in the area of land required to construct the Proposed Scheme which will be constructed in cutting. Works in the area of the infilled pond will include access track realignment and construction of a balancing pond access road. For the purposes of this assessment a realistic and worst case assumption has been made that the well has undergone manual infilling. There are no surface watercourses, surface water bodies or properties within 250m of the infilled pond. Superficial deposits are classified as a Secondary A aquifer and the bedrock is classified as a Secondary B aquifer.

Table 60: 20-31 Infilled pond Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Likely	Minor	Moderate/low
		Controlled waters - surface waters	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor
		Direct run-off from site	Unlikely	Minor	Very low
	Property - infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into enclosed spaces	Unlikely	Moderate	Low
Main risk	Moderate/low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.
There may be an increased risk to groundwater during construction if potential contamination from the infilled pond is mobilised.

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Table 61: 20-31 Infilled pond Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Controlled waters - groundwater within Secondary A superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - surface waters	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
		Migration and accumulation of ground-gas into enclosed spaces	Unlikely	Moderate	Low
Main risk	Low				

Note

The infilled pond may not be entirely disturbed so the risks are considered to remain the same as at baseline.
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Table 62: 20-31 Infilled pond Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Range of significance				Negligible to minor adverse	Negligible

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Table 63: 20-33 Infilled Well Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary (undifferentiated) superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - Birmingham and Fazeley Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

The infilled well is located within the western area of land required for construction and the proposed alignment will be constructed in viaduct. The area of land closest to the infilled well will be used for a compound, utilities works and viaduct construction. For the purposes of this assessment a realistic and worst case assumption has been made that the well has undergone manual infilling. Birmingham and Fazeley Canal is adjacent to the site and a residential property lies 25m to the west of the infilled well. Superficial deposits are classified as a Secondary (undifferentiated) aquifer and the bedrock is classified as a Secondary B aquifer. It is considered unlikely that more than only slight contamination is present associated with the infilled ground.

Table 64: 20-33 Infilled well Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary (undifferentiated) superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - Birmingham and Fazeley Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.
The well itself is unlikely to be disturbed during construction so risks are considered to remain the same as at baseline.

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Table 65: 20-33 Infilled well Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary (undifferentiated) superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - Birmingham and Fazeley Canal	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

The infilled well is unlikely to have been disturbed during construction so risks are considered to remain the same as at baseline.

Table 66: 20-33 Infilled well Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary (undifferentiated) and Secondary B aquifers.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Low	Low		
Range of significance				Negligible	Negligible

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Table 67: 20-38 Infilled pond Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Adjacent site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary (undifferentiated) superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - surface waters	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

The infilled pond is located adjacent to Parklands Stud in Marston in the area of land required to construct the Proposed Scheme which will be constructed in cutting (Leeds Spur). The land in the area of the infilled pond will be used for railhead construction and, subsequently, ecological mitigation. For the purposes of this assessment a realistic and worst case assumption has been made that the pond has undergone manual infilling. Superficial deposits are classified as a Secondary (undifferentiated) aquifer and the bedrock is classified as a Secondary B aquifer.

Table 68: 20-38 Infilled pond Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Adjacent site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary (undifferentiated) superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - surface waters	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.
 Construction of the railhead will disturb the area of the infilled pond and there is likely to be an increased risk to groundwater due to the increased potential for mobilisation and leaching of contaminants

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Table 69: 20-38 Infilled pond Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Adjacent site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Very low
	Controlled waters - groundwater within Secondary (undifferentiated) superficial and Secondary B bedrock aquifers	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) and Secondary B aquifers	Low likelihood	Minor	Very low
	Controlled waters - surface waters	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Very low
Main risk	Very low				

Note

Any contaminated material is likely to have been removed.

Table 70: 20-38 Infilled pond Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary (undifferentiated) and Secondary B aquifers.	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Very low	Negligible	Minor beneficial
Migration and accumulation of ground-gas into property	Low	Low	Very low	Negligible	Minor beneficial
Main risk	Low	Moderate/low	Very low		
Range of significance				Negligible to minor adverse	Negligible to minor beneficial

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Table 71: 20-39 Infilled pond Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

The infilled pond is located adjacent to Cocksparrow House farm in the area of land required to construct the Proposed Scheme which will be constructed in cutting (Leeds Spur). The area of the infilled pond will be used for a railhead and subsequently, ecological mitigation. For the purposes of this assessment a realistic and worst case assumption has been made that the pond has undergone manual infilling. A pond is located 150m to the north of the infilled pond and there are residential properties directly to the north of the infilled pond. Bedrock is classified as a Secondary B aquifer; superficial deposits are absent.

Table 72: 20-39 Infilled pond Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment.
 The infilled pond is unlikely to be disturbed during construction of the railhead but contamination may have migrated from the infilled well so there is potential for mobilisation of potential contamination. There is therefore considered to be an increased risk to groundwater during construction.

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Table 73: 20-39 Infilled pond Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled pond Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary (undifferentiated) and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

Any contamination encountered in the area required to construct the Proposed Scheme will be removed, but the infilled pond itself is likely to remain undisturbed so the risks are considered to remain the same as at baseline.

Table 74: 20-39 Infilled pond Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in and Secondary B aquifer.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Range of significance				Negligible to minor adverse	Negligible

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Table 75: 20-40 M42 Mullensgrove Farm historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>M42 Mullensgrove Farm historical landfill</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A and Secondary (undifferentiated) superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A, Secondary (undifferentiated) and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Birmingham and Fazeley Canal and ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description
M42 Mullensgrove Farm historical landfill is located directly to the north-west of the M42 motorway, within 50m of the area of land required to construct the Proposed Scheme (Leeds Spur), which will be constructed in cutting. The landfill accepted inert waste between 1984 and 1985. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There are residential and commercial properties within approximately 50m of the east of the site and approximately 200m of the south of the site. The nearest surface waters are the Birmingham and Fazeley Canal which is adjacent to the landfill and there are numerous ponds located within 250m. Superficial deposits in this location are classified as Secondary A and Secondary (undifferentiated) aquifers and the underlying bedrock is classified as a Secondary B aquifer.

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Table 76: 20-40 M42 Mullensgrove Farm historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
<p>M42 Mullensgrove Farm historical landfill</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A and Secondary (undifferentiated) superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A, Secondary (undifferentiated) and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - Birmingham and Fazeley Canal and ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation is unlikely to be undertaken because the landfill lies outside of the area of land required to construct the Proposed Scheme.
- it is unlikely that remediation will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. It is considered unlikely that contamination which may have migrated from the landfill will be encountered within the area of landtake, but there may be a slightly increased risk of contaminants leaching to groundwater.

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Table 77: 20-40 M42 Mullensgrove Farm historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
<p>M42 Mullensgrove Farm historical landfill</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A and Secondary (undifferentiated) superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A, Secondary (undifferentiated) and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Birmingham and Fazeley Canal and ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is assumed that the landfill will remain in its baseline state and it will have been undisturbed during construction.
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Table 78: 20-40 M42 Mullensgrove Farm historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low risk	Low risk	Low risk	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

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Table 79: 20-41 Cocksparrow Farm historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Cocksparrow Farm historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site farm properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B Bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Likely	Minor	Moderate/low
	Controlled waters - Birmingham and Fazeley Canal and ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Likely	Negligible	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Main risk					Moderate/low risk

Description					
Cocksparrow Farm historical landfill is located to the east of the M42 motorway directly adjacent to the route of the Leeds Spur, which will be constructed in cutting, within the area of land required to construct the Proposed Scheme. The landfill was operational between 1964 and 1988 and limited records held by North Warwickshire Borough Council indicate that the contents of the landfill include incinerated household waste, iron foundry waste and car batteries. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There are residential and farm properties adjacent to and within 250m of the landfill; it is understood these properties will be demolished. The nearest surface waters are the Birmingham and Fazeley Canal and a pond which are located 150m to the east and 165m to the north-east of the site respectively. The bedrock underlying the site is classified as a Secondary B aquifer.					

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Table 80: 20-41 Cocksparrow Farm historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Cocksparrow Farm historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
	Off-site residents	Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
	Users of off-site farm properties	Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
		Not present during construction	n/a	n/a	n/a
	Controlled waters - Secondary B Bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	High likelihood	Minor	Moderate
	Controlled waters - Birmingham and Fazeley Canal and ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Likely	Negligible	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate Risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be undertaken prior to construction to characterise the waste and delineate the landfill boundaries.
- the most likely form of remediation is removal of the waste materials.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. The Leeds Spur will be constructed in cutting, disturbing the landfill, which is likely to mobilise contamination and increase the risk of leaching to groundwater temporarily during construction, irrespective of mitigation measures implemented.

Table 81: 20-41 Cocksparrow Farm historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Cocksparrow Farm historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
	Off-site residents	Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
	Users of off-site farm properties	Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
		Not present post-construction	n/a	n/a	n/a
	Controlled waters - Secondary B Bedrock aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters - Birmingham and Fazeley Canal and ponds	Lateral migration through groundwater	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact with contaminated soils and waters.	Unlikely	Minor	Very low
		Exposure to explosive gases	Unlikely	Minor	Very low
Main risk	Very low risk				

Note

It is assumed that all waste present at baseline will be removed and any necessary remediation carried out.

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Table 82: 20-41 Cocksparrow Farm historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	n/a	n/a	n/a	n/a
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	n/a	n/a	n/a	n/a
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	n/a	n/a	n/a	n/a
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	n/a	n/a	n/a	n/a
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	n/a	n/a	n/a	n/a
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	n/a	n/a	n/a	n/a
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	n/a	n/a	n/a	n/a
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	n/a	n/a	n/a	n/a
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	n/a	n/a	n/a	n/a
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Moderate/low	Moderate	Very low	Minor adverse	Moderate beneficial
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Discharge of contaminants to surface water by direct run-off from site	Very low	Low	Very low	Minor adverse	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Very low	Negligible	Minor beneficial
Migration and accumulation of ground-gas into property	Low	Low	Very low	Negligible	Minor beneficial

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Moderate/low	Moderate	Very low		
Overall significance				Negligible to minor adverse	Negligible to moderate beneficial

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Table 83: 20-45 Infilled well Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - pond - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Description

The infilled well is located within the western area of land required for construction of the Proposed Scheme which will be constructed on embankment. For the purposes of this assessment a realistic and worst case assumption has been made that the well has undergone manual infilling. It is considered unlikely that more than only slight contamination is present associated with the infilled ground. The area of land closest to the infilled well will be used for upgrading and widening of existing track for access route and flood compensation areas. Superficial deposits are classified as a Secondary A aquifer and the bedrock is classified as a Secondary B aquifer. There are residential and commercial properties of Maple Leaf Farm adjacent to the infilled well, and residential and commercial properties of Middleton House Farm approximately 200m to the east.

Table 84: 20-45 Infilled well Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Low
	Controlled waters - groundwater within Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - pond - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment. The area of the infilled well may be disturbed during construction, as part of the upgrading and widening of an existing access track.

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Table 85: 20-45 Infilled well Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - pond - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

Any contamination encountered in the area required to construct the Proposed Scheme will be removed, but it is conservatively assumed that the infilled well will not be completely disturbed so the risks are considered to remain the same as at baseline.

Table 86: 20-45 Infilled well Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Range of significance				Negligible to minor adverse	Negligible

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Table 87: 20-48 Middleton Hall No.2 historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Middleton Hall No.2 historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - drains, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Ecological receptors - Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Middleton Hall No.2 historical landfill is located 70m to the east of the area of the area required to construct the Proposed Scheme and approximately 150m to the east of the Proposed Scheme, which will be constructed in cutting. The landfill accepted industrial and inert waste between 1971 and 1994. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. Works closest to the landfill will include earthworks associated with the cutting and ecological mitigation works. There are no properties in the study area within 250m of the landfill. There are numerous ponds and drains within 250m of the site and Middleton Pool SSSI is located 70m to the north of the landfill. Superficial deposits in this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

Table 88: 20-48 Middleton Hall No.2 historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Middleton Hall No.2 historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - drains, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Low likelihood	Minor	Low
	Ecological receptors - Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Moderate/low Risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation will be undertaken within the landfill area prior to construction to because the landfill lies outside of the area required for construction.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.
- landfill gas monitoring and mitigation measures may be required.

Note

Construction workers have not been included in this assessment. There is the potential for contamination to have migrated from the landfill to the area of landtake, and there may be a slightly increased risk of contaminants leaching to groundwater during earthworks for construction of the Proposed Scheme. However, the landfill itself would remain undisturbed during construction.

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Table 89: 20-48 Middleton Hall No.2 historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
<p>Middleton Hall No.2 historical landfill</p> <p>Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.</p>	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - drains, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Ecological receptors - Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is assumed that the landfill will remain undisturbed and risks are therefore considered to remain the same as at baseline.

Table 90: 20-48 Middleton Hall No.2 historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Low	Minor adverse	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Exposure of ecological receptors to contamination	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

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Table g1: 20-49 Infilled well Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at Baseline without mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters – surface waters	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low	
	Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low	
Main risk	Low				

Description

The infilled well is located 20m to the west of the area of land required to construct the Proposed Scheme which will be constructed in cutting. Proposed works closest to the location of the infilled well include the realignment of Church Lane. For the purposes of this assessment a realistic and worst case assumption has been made that the well has undergone manual infilling. It is considered unlikely that more than only slight contamination is present associated with the infilled ground. There are residential properties at and directly adjacent to the site and commercial properties of a farm and a sewage works approximately 100m to the north-west and 95m to the east respectively. Langley Brook, a pond and a drain are present within 180m of the south of the site. Superficial deposits are absent and the bedrock is classified as a Secondary B aquifer.

Table g2: 20-49 Infilled well Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - Langley Brook, pond, drain	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of infilled ground is unlikely to be required prior to construction.
- remediation is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Notes

Construction workers have not been included in this assessment so the human health risks remain the same from baseline to construction.

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Table 93: 20-49 Infilled well Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Infilled well Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, other inorganic contaminants, organic contaminants, asbestos, carbon dioxide, methane, carbon monoxide, hydrogen sulphide and trace gases.	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary B aquifer	Low likelihood	Minor	Low
	Controlled waters - Langley Brook, pond, drain	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low				

Note

Any contamination encountered in the area required to construct the Proposed Scheme will have been removed, but the infilled well itself will remain undisturbed so the risks are considered to remain the same as at baseline.

Table 94: 20-49 Infilled well Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary B aquifer.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Very low	Very low	Very low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Low	Low		
Range of significance				Negligible	Negligible

Table 95: 20-50 Middleton Hall Sand and Gravel historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Middleton Hall Sand and Gravel historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Middleton Pool, drains, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
	Ecological receptors - Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low risk				

Description
Middleton Hall Sand and Gravel historical landfill is located 120m to the east of the area required for construction (highway works and landscaping proposed in this location) and approximately 550m to the east of the Proposed Scheme itself, which will be constructed in cutting and on embankment. The dates of operation are not known, but the landfill accepted industrial and inert waste. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There are residential and commercial properties within approximately 65m of the landfill. The nearest surface waters are Middleton Pool to the south-west of the landfill and numerous other ponds in the surrounding area. Middleton Pool SSSI is located adjacent south-west of the landfill and there are a number of drains and ponds within 250m of the site. Superficial deposits encroaching on the landfill boundary are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

Table 96: 20-50 Middleton Hall Sand and Gravel historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Middleton Hall Sand and Gravel historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Middleton Pool, drains, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
	Ecological receptors - Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- it is unlikely that a ground investigation within the landfill area will be undertaken prior to construction because the landfill lies outside of the area of required for construction.
- it is unlikely that remediation will be required, although mitigation measures in the form of landfill gas monitoring and venting may be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. Risks during construction are considered to remain the same as at baseline because there are no substantial earthworks close to the landfill so there is little potential for mobilisation of existing contamination.

Table 97: 20-50 Middleton Hall Sand and Gravel historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Middleton Hall Sand and Gravel historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Middleton Pool, drains, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low

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Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
	Ecological receptors - Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low risk				

Note

It is assumed that the landfill will remain in its baseline state and it will have been undisturbed during construction.
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Table 98: 20-50 Middleton Hall Sand and Gravel historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into enclosed spaces	Low	Low	Low	Negligible	Negligible
Exposure of ecological receptors to contamination.	Low	Low	Low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

Table 99: 20.53 Former petrol filling station Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Former petrol filling station Existing contaminants in the soils and groundwater at the site, including fuels and oils	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - drain - Middleton Pool	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
	Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low				

Description

A petrol filling station was formerly located off the A4091 Coleshill Road in Middleton approximately 70m to the east of the area required to construct the Proposed Scheme, which will be constructed in cutting. Works closest to the former filling station include the realignment of Church Lane. A residential property of Park Gate House is now present on the site and there are residential and commercial properties within approximately 50m of the south of the site. Superficial deposits are classified as a Secondary A aquifer and groundwater within the bedrock is classified as a Secondary B aquifer. A drain is located 40m to the east of the site and Middleton Pool is located approximately 180m to the south east. For the purposes of this assessment a realistic and worst case assumption has been made that storage tanks at the filling station leaked and contaminants are present in the soil and groundwater.

Table 100: 20-53 Former petrol filling station Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Former petrol filling station Existing contaminants in the soils and groundwater at the site, including fuels and oils	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - drain - Middleton Pool	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low

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Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
	Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation encompassing the area of the former filling station is unlikely to be required prior to construction.
- remediation over and above the removal of contaminated material is unlikely to be required.
- during construction standard mitigation procedures will be in place in accordance with the Draft Code of Construction Practice.

Note

Construction workers have not been included in this assessment.
The area of the former filling station lies outside of the area of land required for construction of the Proposed Scheme but there is the potential for contamination to be disturbed which has migrated from the site. There is considered to be no change in risk due to the distance of the former filling station from the area of land required to construct the Proposed Scheme.

Table 101: 20.53 Former petrol filling station Post-Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Former petrol filling station Existing contaminants in the soils and groundwater at the site, including fuels and oils	On-site residents	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - groundwater within Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - drain - Middleton Pool	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low

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Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Minor	Low
	Middleton Pool SSSI	Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Unlikely	Moderate	Low
Main risk	Low				

Note

It is not considered that there will be any change from the baseline conditions because, although any contaminated material encountered will be removed from the area of land required to construct the Proposed Scheme, the actual area of the former filling station will remain undisturbed so the potential risks will remain the same as at baseline.

Table 102: 20.53 Former petrol filling station Significance of Effects

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Low	Low	Low	Negligible	Negligible
Exposure of ecological receptors to contaminants in windblown, soil-derived dust, in direct run-off and in migrating groundwater	Low	Low	Low	Negligible	Negligible

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Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Low	Low		
Range of significance				Negligible	Negligible

Table 103: 20-58 Birmingham and Derby railway line Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Birmingham and Derby railway line Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, hydrocarbons, asbestos, sulphates	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Minworth Effluent conduit - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

The Birmingham and Derby railway line (constructed by the 1920s and is partially in cutting at this location) will be crossed by the Proposed Scheme on viaduct. A range of contaminants including fuels, oils and other organic and inorganic contaminants are associated with existing railway lines. There are residential properties of Newlands Farm located approximately 200m to the north-west of the railway line and commercial properties of Hams Hall distribution park border the railway line directly to the east. Minworth Effluent Conduit lies approximately 135m to the south of the site and there are surface water drains adjacent to and within 100m of the Birmingham and Derby railway line. Superficial deposits in this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

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Table 104: 20-58 Railway line Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Birmingham and Derby railway line Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, hydrocarbons, asbestos, sulphates	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - Minworth Effluent conduit - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be undertaken prior to construction to characterise the ground conditions.
- remediation in the form of removal of contamination material may be required.
- during construction/remediation standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There is considered to be an increased risk to controlled waters during construction as a result of mobilisation of existing contamination and increased potential for leaching to groundwater.

Table 105: 20-58 Birmingham and Derby railway line Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Birmingham and Derby railway line Existing contaminants in the soils and groundwater at the site, potentially including but not limited to metals, hydrocarbons, asbestos, sulphates	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Minor	Low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Low likelihood	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - Minworth Effluent conduit - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

Contamination encountered within the area of landtake will have been removed or remediated. However, the Birmingham and Derby railway line will remain operational so risks are considered to remain the same as at baseline

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Table 106: 20-58 Birmingham and Derby railway line Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A and Secondary B aquifers.	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

Table 107: 20-61 Hams Hall electricity substation Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Hams Hall electricity substation Landfill gas such as carbon dioxide, methane, hydrogen sulphide.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site residential properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Low likelihood	Minor	Low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low risk
Main risk	Low risk				

Description

Hams Hall electricity substation is located adjacent to the area of land required to construct the Proposed Scheme where the Kingsbury Road railhead spur branches off from the Birmingham and Derby line. The branch will be constructed in retained cutting. A realistic and worst case scenario has been assumed that transformer oils have leaked or been spilled to ground during operation or maintenance and a range of contaminants including oils are associated with the substation. There are commercial properties approximately 200m to the east of the site and residential properties approximately 210m to the south of the site. There are drains directly adjacent to the substation. Superficial are classified as unproductive strata and the underlying bedrock is classified as a Secondary B aquifer.

Note

The superficial deposits at the site comprise glaciolacustrine deposits which are classified as unproductive strata and would therefore afford some protection to the Secondary B bedrock aquifer from leached contaminants.

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Table 108: 20-61 Hams Hall electricity substation Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Hams Hall electricity substation Landfill gas such as carbon dioxide, methane, hydrogen sulphide.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site residential properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Likely	Minor	Moderate/low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Likely	Minor	Moderate/low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low risk
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation is unlikely to be required on the landfill prior to construction
- it is unlikely that remediation over and above the removal of contaminated material, if encountered, will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There may be an increased risk to groundwater and surface water receptors as a result of the mobilisation of contaminants during construction of the Kingsbury Road railhead branch in cutting.

Table 109: 20-61 Hams Hall electricity substation Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Hams Hall electricity substation Landfill gas such as carbon dioxide, methane, hydrogen sulphide.	Current site users	Direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site residential properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of off-site commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary A superficial and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A and Secondary B aquifers	Likely	Minor	Low
	Controlled waters - drains	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low risk
Main risk	Low risk				

Note

The electricity substation will be undisturbed during construction so the risks are considered to remain the same as at baseline. Any contaminated material encountered within the area of land required to construct the Proposed Scheme will be removed, but the electricity substation would remain operational.

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Table 110: 20-61 Hams Hall electricity substation Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site humans to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residents) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (workers) to contamination by inhalation of migrating volatile vapours from contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial and Secondary B bedrock aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Low	Minor adverse	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Moderate/low	Low	Minor adverse	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low risk	Low risk	Low risk	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

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Table 111: 20-62 Dunton Island landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Dunton Island landfill Landfill gas such as carbon dioxide, methane, hydrogen sulphide.	Current site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of adjacent commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Low risk				

Description

Dunton Island landfill is a registered landfill and an inert waste recycling facility lying directly to the west of the area of land required for construction and approximately 80m to the west of the alignment which will be constructed in cutting, part of it retained. The landfill is licensed to accept inert waste including construction, demolition and dredging waste. A realistic and worst case scenario is assumed that landfill gas is associated with the landfill, but given the landfill is permitted it is assumed that it is lined and there is minimal potential for the generation of leachate. The adjacent area of land required to construct the Proposed Scheme will be used for cutting earthworks and highway works. There are commercial properties adjacent to the landfill and a pond approximately 175m to the north. Superficial deposits at and around the landfill are classified as unproductive strata and the underlying bedrock is classified as a Secondary B aquifer.

Note

North Warwick Borough Council have reported that this site is in effect used as an inert waste recycling site handling largely inert wastes and incinerator bottom ash. A significant proportion of landfill material still exists at the site although part of the operation aims to recover materials from the landfilled waste.

Table 112: 20-62 Dunton Island landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Dunton Island landfill Landfill gas such as carbon dioxide, methane, hydrogen sulphide.	Current site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of adjacent commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Likely	Minor	Moderate/low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation is unlikely to be required on the landfill prior to construction; however, landfill gas monitoring is likely to be required adjacent to the landfill at the boundary with the Proposed Scheme.
- it is unlikely that remediation over and above the removal of contaminated material, if encountered, will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment. There may be an increased risk during construction to groundwater as a result of the mobilisation of contaminants.

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Table 113: 20-62 Dunton Island landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Dunton Island landfill Landfill gas such as carbon dioxide, methane, hydrogen sulphide.	Current site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Users of adjacent commercial properties	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Negligible	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Negligible	Very low
		Inhalation of migrating ground-gas and volatile vapours from contaminated soil/water	Low likelihood	Negligible	Very low
	Controlled waters - Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Principal bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - pond	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
		Migration and accumulation of ground-gas into property	Unlikely	Moderate	Low risk
Main risk	Low risk				

Note

The landfill will be undisturbed during construction so the risks are considered to remain the same as at baseline. Landfill gas mitigation measures such as venting may be required to protect the proposed infrastructure adjacent to the landfill.

Table 114: 20-62 Dunton Island landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of on-site human receptors to contamination by direct contact and ingestion of contaminants in contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of on-site human receptors to contamination by inhalation of ground-gas and volatile vapours from contaminated soil/water	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (commercial) to contamination by inhalation of migrating ground-gas and volatile vapours from migrating contaminated soil/water	Very low	Very low	Very low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Principal bedrock aquifer	Low	Moderate/low	Low	Minor adverse	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Very low	Very low	Very low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Migration and accumulation of ground-gas into property	Low	Low	Low	Negligible	Negligible
Main risk	Low	Moderate/low	Low		
Overall significance				Negligible to minor adverse	Negligible

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Table 115: 20-63 Mullensgrove Farm Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Mullensgrove Farm Fuels, oils, pesticides, fertilisers and a full range of other organic and inorganic contaminants	Current site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in contaminated waters	Low likelihood	Minor	Low
		Inhalation of volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drain, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

Mullensgrove Farm lies on the route of the proposed Leeds Spur which will be constructed in cutting. The farm is understood to also run a recycling facility on the premises so a full range of contaminants is potentially present. There are residential properties within 250m to the south and east of the farmstead. There is a surface water drain adjacent to the site and two ponds within 150m of the east of the site. Superficial deposits at this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

Table 116: 20-63 Mullensgrove Farm Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Mullensgrove Farm Fuels, oils, pesticides, fertilisers and a full range of other organic and inorganic contaminants	Current site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Not present during construction		
		Direct contact and ingestion of contaminants in contaminated waters	Not present during construction		
		Inhalation of volatile vapours from contaminated soil/water	Not present during construction		
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Likely	Minor	Moderate/low
	Controlled waters - drain, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Likely	Minor	Moderate/low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Moderate/low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation will be required prior to construction because the site is located on the route of the proposed Leeds Spur.
- it is unlikely that remediation over and above the removal of contaminated material will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment.
It is understood that on-site properties will be demolished so the on-site receptors at baseline will no longer be present. There may be an increased risk to groundwater and surface water during construction due to the increased potential for mobilisation and leaching of existing contamination.

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Table 117: 20-63 Mullensgrove Farm Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Mullensgrove Farm Fuels, oils, pesticides, fertilisers and a full range of other organic and inorganic contaminants	Current site users	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Not present during post-construction		
		Direct contact and ingestion of contaminants in contaminated waters	Not present during post-construction		
		Inhalation of volatile vapours from contaminated soil/water	Not present during post-construction		
	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Unlikely	Minor	Very low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Unlikely	Minor	Very low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Unlikely	Minor	Very low
	Controlled waters - drain, ponds	Lateral migration of contaminants in groundwater and discharge as base flow	Unlikely	Minor	Very low
		Direct run-off from site	Unlikely	Minor	Very low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Unlikely	Negligible	Very low
Main risk	Very low risk				

Note

The proposed Leeds Spur will have been constructed in the area of the farm, so it is considered that there will be no residual source of contamination as any contamination encountered within the area of land required to construct the Proposed Scheme will be removed or remediated.

Table 118: 20-63 Mullensgrove Farm Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Receptor not present during construction	Receptor not present during post-construction	n/a	n/a
Exposure of on-site human receptors to contamination by direct contact and ingestion of contaminants in contaminated water	Low	Receptor not present during construction	Receptor not present during post-construction	n/a	n/a
Exposure of on-site human receptors to contamination by inhalation of volatile vapours from contaminated soil/water	Low	Receptor not present during construction	Receptor not present during post-construction	n/a	n/a
Exposure of off-site human receptors (residential) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Very low	Negligible	Minor beneficial
Exposure of off-site human receptors (residential) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residential) to contamination by inhalation of migrating volatile vapours from migrating contaminated soil/water	Low	Low	Very low	Negligible	Minor beneficial
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial and Secondary B bedrock aquifer	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Moderate/low	Very low	Minor adverse	Minor beneficial
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Very low	Negligible	Minor beneficial
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Moderate/low	Very low		
Overall significance				Negligible to minor adverse	Negligible to minor beneficial

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Table 119: 20-73 Birmingham Road historical landfill Baseline CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Birmingham Road historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains, ponds, River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Description

Birmingham Road historical landfill lies approximately 100m to the north-east of the area of land required to construct the Proposed Scheme. The land in this area will be used for ecological mitigation and, 250m to the south east, for a balancing pond and access road. The landfill accepted inert waste between 1991 and 1992. A realistic and worst case scenario is assumed that a full range of contaminants including leachate and landfill gas are associated with the historical landfill. There are residential properties 160m to the west of the landfill. Drains and ponds are directly adjacent to the landfill and the River Tame lies 50m to the west. Superficial deposits at this location are classified as a Secondary A aquifer and the underlying bedrock is classified as a Secondary B aquifer.

Table 120: 20-73 Birmingham Road historical landfill Construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at construction with mitigation
Birmingham Road historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains, ponds, River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

The above risk assessment assumes that the below mitigation measures will be applied during construction:

- a ground investigation is unlikely to be required prior to construction.
- it is unlikely that remediation over and above the removal of contaminated material will be required.
- during construction standard mitigation procedures will be in place in accordance with the Code of Construction Practice.

Note

Construction workers have not been included in this assessment.
The landfill lies outside of the area of land required to construct the Proposed Scheme and any contamination which may have migrated from the landfill is unlikely to be disturbed during construction. The risks are considered to remain the same as at baseline.

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Table 121: 20-73 Birmingham Road historical landfill Post-construction CSM and Qualitative Risk Assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction with mitigation
Birmingham Road historical landfill Existing contaminants in the soils and groundwater at the site, potentially including but not limited to a range of inorganic and organic contaminants, leachate and landfill gas.	Off-site residents	Direct contact, ingestion and inhalation of contaminants in windblown soil-derived dust	Low likelihood	Minor	Low
		Direct contact and ingestion of contaminants in migrating contaminated waters	Unlikely	Minor	Very low
		Inhalation of migrating volatile vapours from contaminated soil/water	Low likelihood	Minor	Low
	Controlled waters - Secondary A superficial aquifer and Secondary B bedrock aquifer	Leaching of contaminants from soil to groundwater and vertical and lateral migration in Secondary A superficial aquifer and Secondary B bedrock aquifer	Low likelihood	Minor	Low
	Controlled waters - drains, ponds, River Tame	Lateral migration of contaminants in groundwater and discharge as base flow	Low likelihood	Minor	Low
		Direct run-off from site	Low likelihood	Minor	Low
	Property - buildings, infrastructure, their foundations and services	Direct contact of property with contaminants in soil and surface water/groundwater	Low likelihood	Negligible	Very low
Main risk	Low risk				

Note

The landfill will remain undisturbed post-construction and the risks are considered to remain the same as at baseline.

Table 122: 20-73 Birmingham Road historical landfill Significance of Effect Assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of off-site human receptors (residential) to contamination by direct contact, ingestion and inhalation of contaminants in windblown, soil-derived dust	Low	Low	Low	Negligible	Negligible
Exposure of off-site human receptors (residential) to contamination by direct contact and ingestion of contaminants in migrating contaminated water	Very low	Very low	Very low	Negligible	Negligible
Exposure of off-site human receptors (residential) to contamination by inhalation of migrating volatile vapours from migrating contaminated soil/water	Low	Low	Low	Negligible	Negligible
Leaching of contaminants from soil to groundwater and vertical and lateral migration in groundwater in Secondary A superficial and Secondary B bedrock aquifer	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminants in groundwater and discharge to surface waters as base flow	Low	Low	Low	Negligible	Negligible
Discharge of contaminants to surface water by direct run-off from site	Low	Low	Low	Negligible	Negligible
Direct contact of property with contaminants in soil and surface water/groundwater	Very low	Very low	Very low	Negligible	Negligible
Main risk	Low	Low	Low		
Overall significance				Negligible	Negligible

4 Inspection notes and other site data

- 4.1.1 There were no site visits carried out due to access constraints, and no additional site data has been identified.

5 Geological SSSI and local geological sites

5.1.1 This appendix presents the following data:

- citation data for geological sites of special scientific interest (SSSI);
- citation data for local geological sites (LGS), formerly called regionally important geological sites (RIGS); and
- any other relevant site data.

5.1.2 There are no geological SSSI or local geological sites in the Curdworth to Middleton study area.

6 Mining and minerals data

- 6.1.1 This appendix presents the following data relating to mining and minerals information:
- details of planning data for minerals sites;
 - lists of marl pits in each study area; and
 - data from The Coal Authority.
- 6.1.2 There are no relevant mining sites or additional relevant mineral data for the Curdworth to Middleton study area.